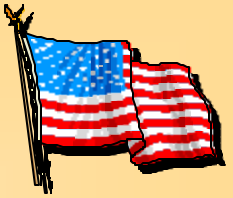
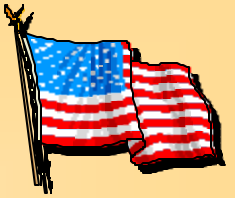


Food and Water: Vehicles for Bioterrorism

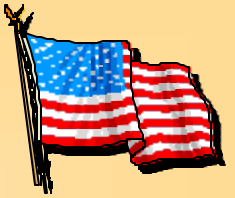
CPT Caroline Kalinowski

Data was compiled from presentations by the US Army Medical Research Institute of Infectious Diseases (USAMRIID) and the USAF Force Protection Battlelab.



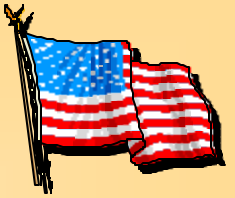
Purpose

- Provide a basic understanding of biological agent usage and the nature of terrorist activities.
- Understand the role of food and water in a bioterrorist event.
- Reinforce food safety practices to minimize the risk of potential food- or water-borne illness due to intentional contamination.



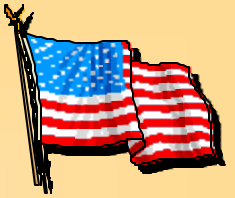
Agenda

- Historical use of Biological Weapons
- Rules for use of Biological Weapons
- Biological Weapon Characteristics
- Characteristics of Terrorist Activities
- Define the Food/Water Threat
- Incidence of Food-borne Illness
- Food & Water Protection Measures
- Questions



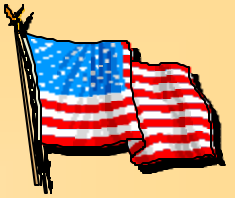
Historical Use of Biological Weapons

- **1346 –** Tartar soldiers catapulted plague-ridden corpses into Crimean port city of Kaffa.
- **Middle ages thru Civil War –** corpses placed in enemy's drinking water.
- **1700s –** smallpox laden blankets distributed to Native Americans by British.
- **WWII –** Japanese used biological agents *(contaminated grain and fleas)* against Soviet Union, Mongolia, and China.
- **Vietnam –** VC use fecal-contaminated pungi sticks.



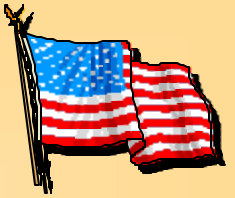
Biological Weapons Use

- Biological weapons become intimately linked to the Cold War.
- 1956 – Soviet Union accuses US of using BW in Korea and threaten their own use of chemical weapons in the future
- 1969 – President Nixon declares US position on biological and chemical weapons use:
  - ✓ **No first use of lethal or incapacitating chemical weapons; Absolutely no use of biological weapons.**



Biological Weapons Ban
-- Biological Weapons Convention 1972 --

- Never develop, produce, stockpile or acquire biological agents or toxins, of types and in quantities that have no justification for prophylactic, protective, or other peaceful purposes.
- Currently signed by 162 nations
  http://www.fas.org/nuke/control/bwc/text/bwcsig.htm

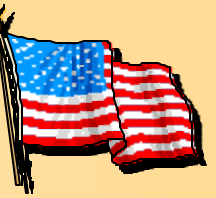


Outlawed Activities

-- Several Signatory Nations Violate Treaty --

Iraq 1985-1991, developed anthrax, botulinum toxin, & aflatoxin

- 8,000 Liters of anthrax
- 20,000 Liters of botulinum toxin
- 10 Liters of concentrated ricin

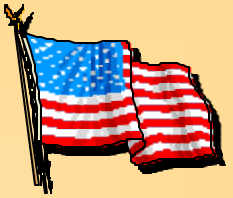


Outlawed Activities

-- Several Signatory Nations Violate Treaty --

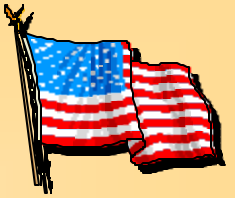
Tokyo, 1995 – Terrorist organization, Aum Shinrikyo, release sarin nerve agent in subway

- **Cult had used sarin in 1994 in Matsumoto, Japan and had made several attempts to release the biological agents anthrax and botulinum toxin.**
- **Event demonstrated terrorist organizations had acquired ability to use unconventional weapons.**



Requirements for Biological Weapon Use

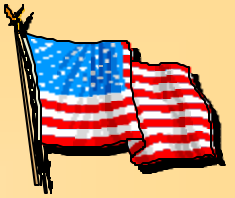
- ✓ Available & easily produced
- ✓ Lethal or incapacitating
- ✓ Easily aerosolized *(not important for food)*
- ✓ Easily disseminated
- ✓ Stable after production
- ✓ Susceptible population



Feasibility of Biological Weapons

- ✓ Low cost
- ✓ Readily available
- ✓ Low technological support
- ✓ Easily disseminated
- ✓ Difficult to detect
- ✓ Deniable
- ✓ Able to cause mass casualties

What makes biological agents more tempting for use as a weapon?

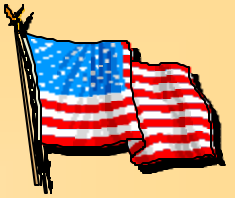


Cost of Operations (Battlefield)

- Conventional Weapons = **$2000 per Km^2**
- Nuclear Weapons = **$800 per Km^2**
- Chemical Weapons = **$600 per Km^2**

What makes biological agents more tempting for use as a weapon?

➔ **Biological Weapons - $1 per Km^2**

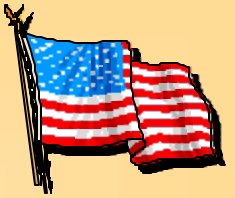


Terrorism vs. War

WAR: Very short incubation periods are preferable for tactical situations ***(toxins)***

TERRORISM: Longer incubation periods are more suitable for terrorist activities *(natural pathogens)*

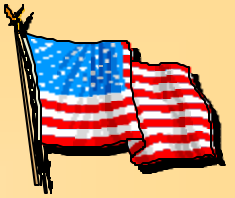
- ➔ **Allows time to distance terrorists from event.**
- ➔ **May appear to be natural epidemic or food related illness.**



Terrorist Objectives

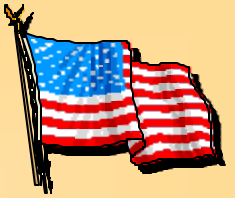
- Induce high morbidity & mortality on target population.
- Disrupt critical event.
- Create panic & public response.
- Economic impact

Cyanide tainted grapes in Chile affects export of product to other countries.



Scenario for Terrorist Attacks

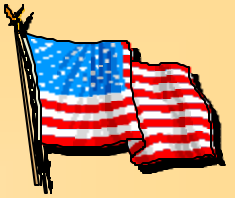
- ➔ Product tampering
- ➔ Attack on ethnic groups in opposition to terrorist goals
- ➔ Sabotage of specific food groups or industries
- ➔ Attacks directed at a country's institutions, agencies, or departments



Domestic Use of Biological Weapons

Oregon (1984) – Salmonella contaminated salad bars.

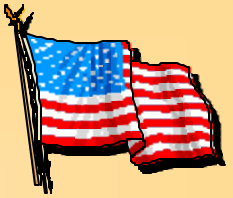
- **10 restaurants implicated; 751 cases of gastroenteritis**
- **Infected employees amplify spread of illness**
- **Errors in food rotation & refrigeration facilitated growth of organism**



Domestic Use of Biological Weapons

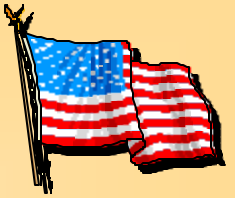
Texas (Medical Center) – 12 laboratory workers become ill after eating tainted pastries.

- E-mail message invited employees to eat pastries in break room.
- Shigella agent was later identified as coming from lab culture collection.
- Motive for and method of contamination unknown.



What is the Food Threat?

- Public accessible foods
- Processed foods
- Water
- Uncooked foods
- Fresh fruits & vegetables
- Agent Vectors
  - 21 species of flies



EXAMPLE
-- Processed Foods --

- 30 grams of ricin toxin
- Easily concealed in a pocket
- Could lethally poison 150 pounds of meat
- Enough to produce 1,500 hotdogs

The Threat is REAL!

EXAMPLE
-- Water --

- Many pathogens survive in water
- Easily disseminated to public
- Bottled water common

- ROWPU effective against toxins, bacteria, viruses, & parasites
- Coagulation/Flocculation not effective against pathogens *(sediments only)*
- Chlorination not effective against parasites

EXAMPLE

-- Fresh Fruits & Vegetables --

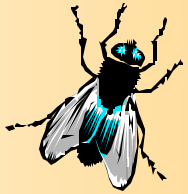
Cyanide-laced grapes from Chile

- ➔ Could have been laced with a biological toxin, bacterium, or viral agent

- FFV often not “washed” and sanitized in field feeding operations

EXAMPLE
-- Agent Vectors --

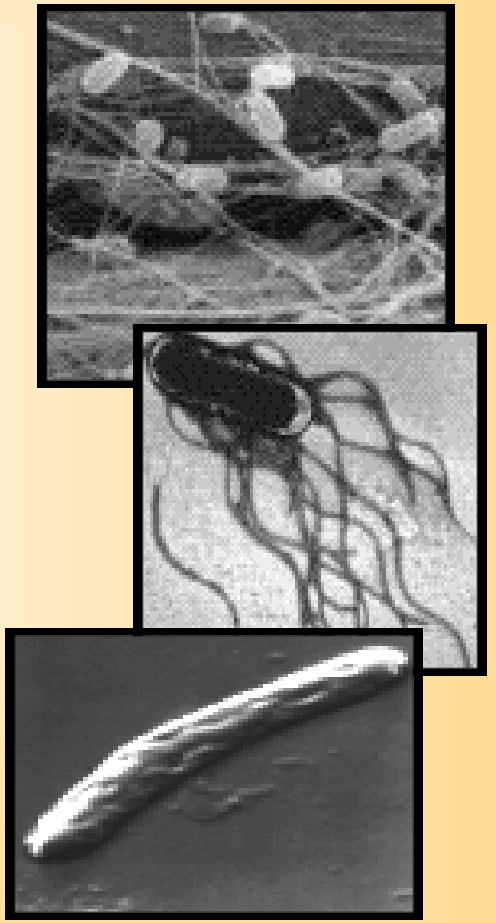
- 47 species of flies associated with filthy conditions
- 21 species represent threat to human health
- May carry numerous pathogens



Could they be used to disseminate pathogens intentionally?

Potential Pathogens

- Numerous possibilities
- Vary from classical BW agents to natural food related pathogens.
- Could include viruses, bacteria, & toxins.
- Spore-forming pathogens may survive traditional food processing temperatures.



Food-borne Illness

- Diagnosed Cases in US are increasing
  (Outbreaks in the News: E-Coli & Listeria)

76 million cases annually

325,000 hospitalizations

5,000 deaths

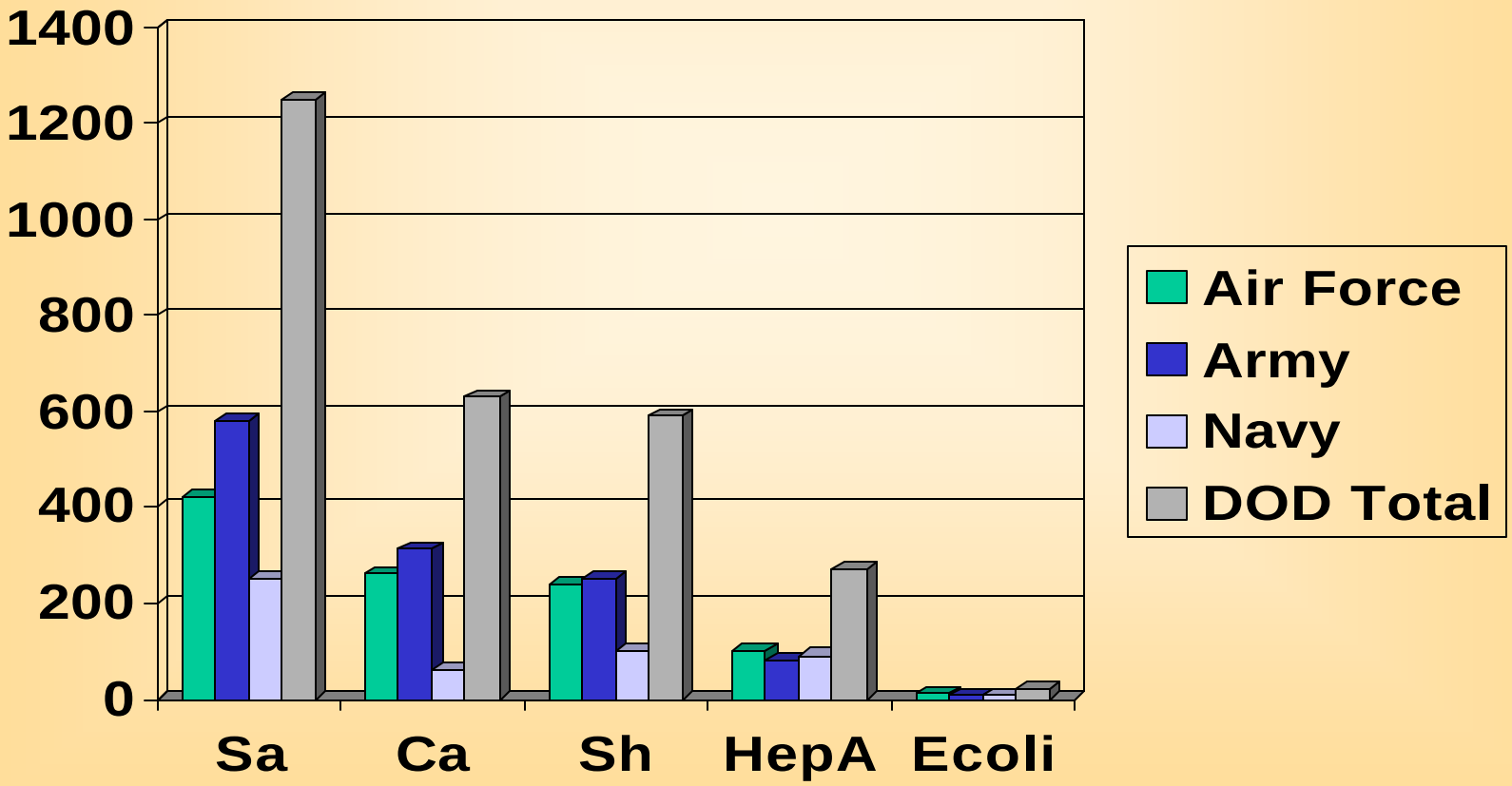
- Undiagnosed Foodborne Illness (FBI)

➔ **What is it?**

➔ **Is it a problem for the Army?**

DOD Reported Illness
Three Year Totals 1996-98

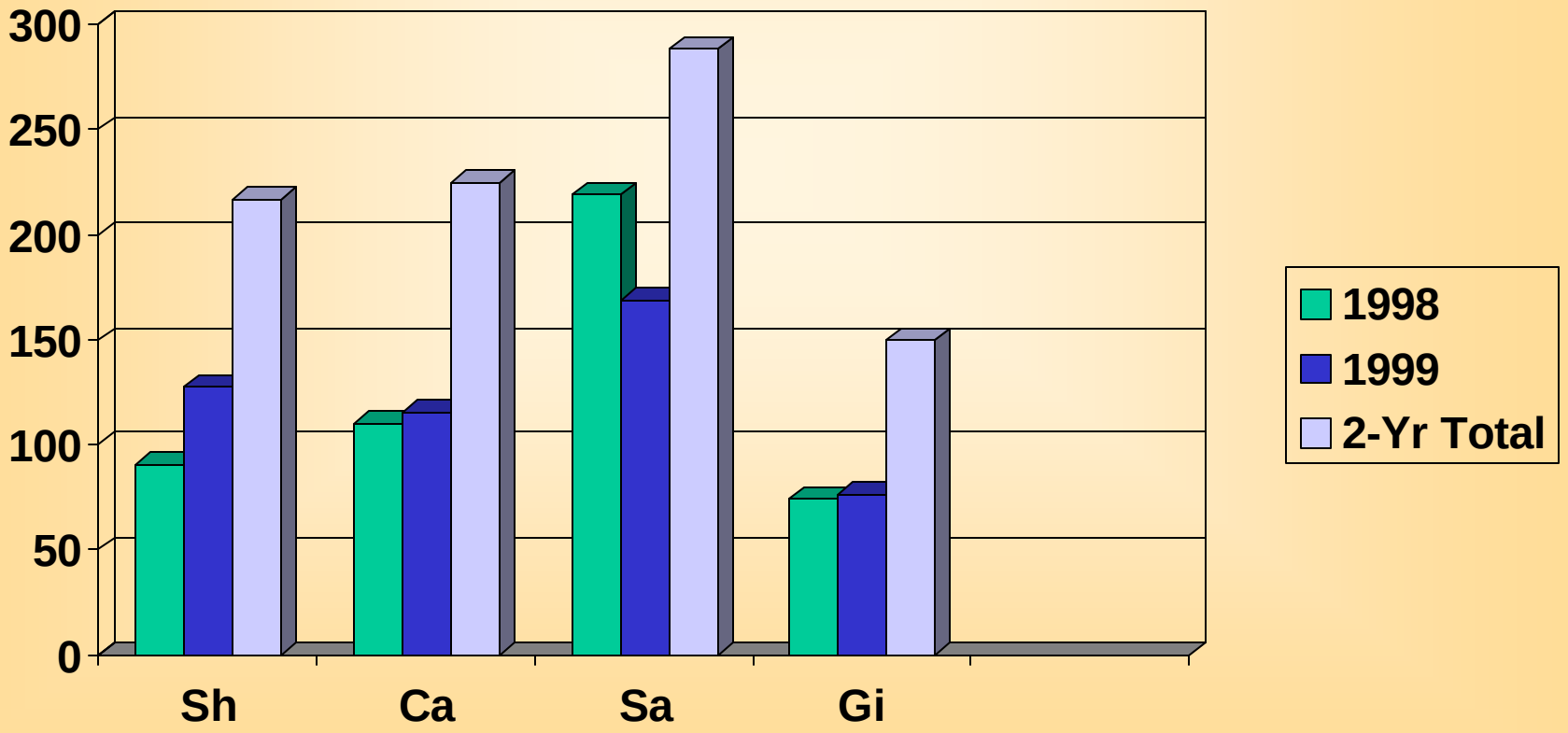
STATS: USAF School of Aerospace Medicine

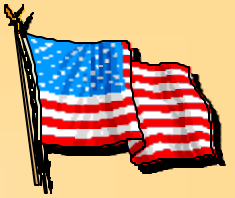


Active Army Reported

Major Food & Waterborne Illness *(1 Jan 98 - 31 Dec 99)*

Stats: Army Medical Surveillance Activity





Foodborne Illness IS a Readiness Issue

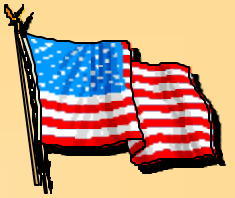
- Americans average 1.4 cases of diarrhea each year
- FBI = Loss of Unit Effectiveness
- Most cases are undiagnosed

Consider the effects of 1 meal in a combat situation.

1998, Saudi Arabia: 110 soldiers hospitalized for Salmonellosis after eating in base camp dining facility.

[43% of casualties came from a single infantry unit]

FACING THE CHALLENGE

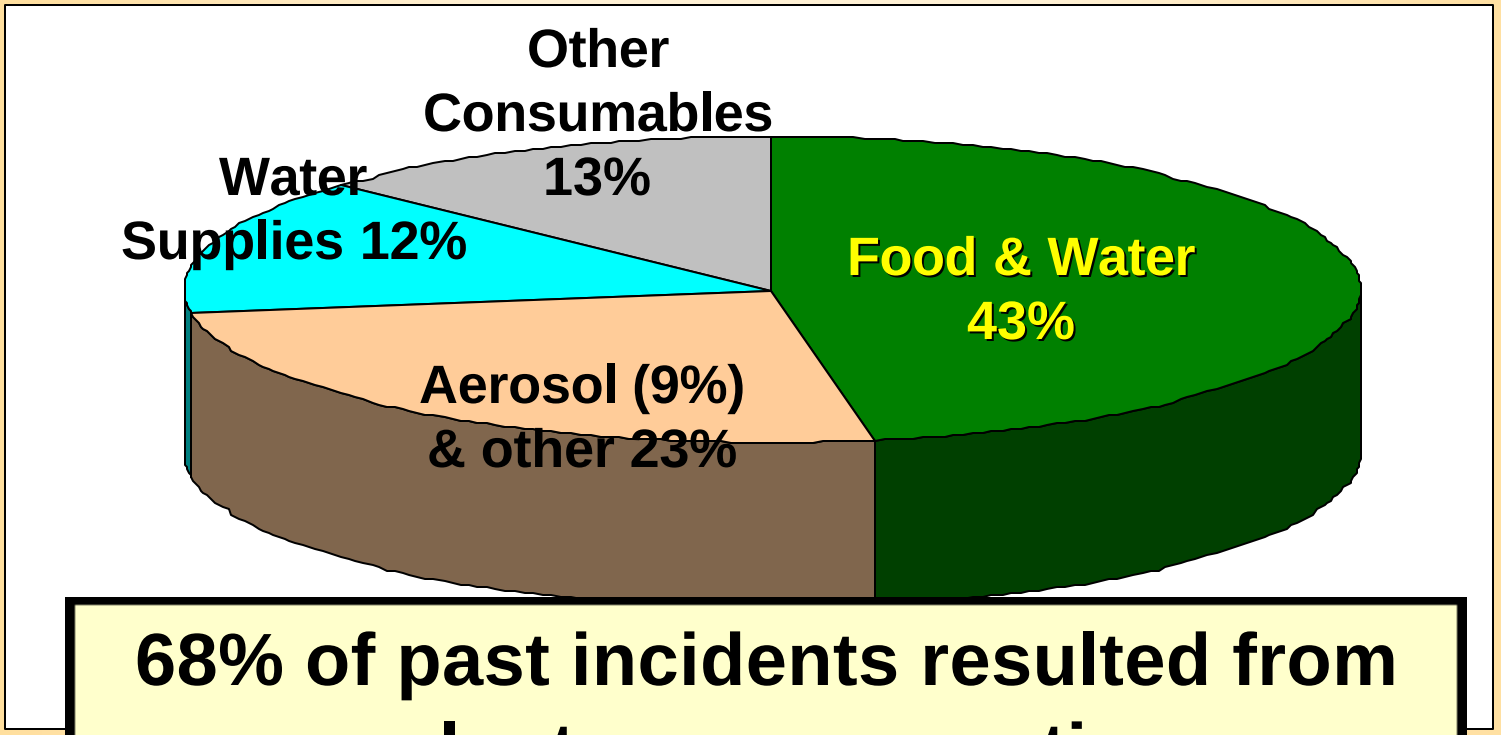


Food & Water Antiterrorism
-- Background --

DoD focused on conventional weapons for distribution of bio-agents *(aerosol delivery).*

- Terrorism: *Consumables and lower technology approach:*
  - ➔ **Lower cost; less risk to perpetrators**
  - ➔ **More select targeting; direct & indirect mission impact**
  - ➔ **Loss of trust or hope**
  - ➔ **Similar to information warfare**

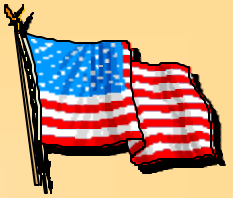
Top 4 Means of CB Terrorism Delivery



68% of past incidents resulted from <u>voluntary</u> consumption

Detection & Confirmation

- Defense against aerosol BW agents has developed into an integrated process of rapid detection followed by more sophisticated technological confirmation
- Rapid detection and screening of foods for natural foodborne pathogens has proven to be difficult
  - **Beware of quick fix rapid screening technologies**



Food and Water Antiterrorism

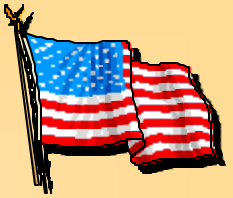
Problem:

- No institutionalized process to address *intentional contamination* of food or water.
- Vulnerability surveys focus on conventional or aerosol attacks with collateral damage to food/water.
- Process & technology are inadequate to protect us.

Solution:

- ✓ ID secure food & water handling procedures.
- ✓ Validate new equipment
- ✓ Institutionalized approach

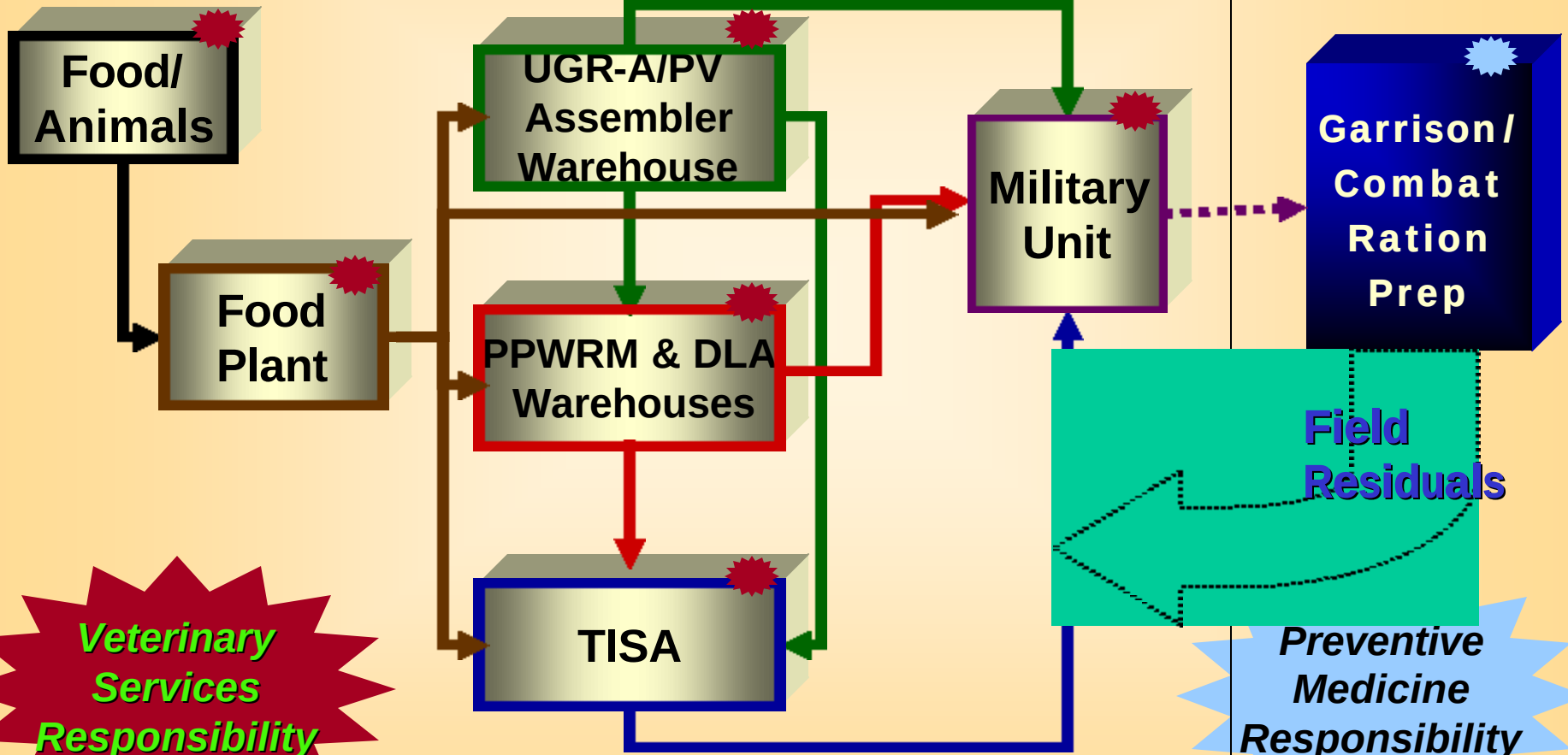
The Role of Army Food Service Personnel



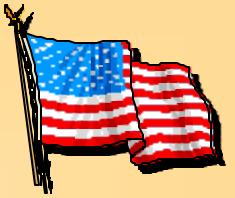
Key Players in Food Safety

- Commanders
- Unit Food Advisors
- Sr Food Operations Sergeants
- AMEDD Personnel
  - **Veterinary Services**
  - **Preventive Medicine**

Army Center of Excellence, Subsistence



The Warfighters' Logistician



Field Medical Support
-- Who Does What? --

BREAKING THE CODE:

The invisible line of responsibility?

GARRISON:

Installation Vet Services & Preventive Medicine

FIELD TRAINING:

Division Level PM & Unit Field Sanitation Teams

DEPLOYMENTS/MISSION SUPPORT:

Veterinary and Preventive Medicine Detachments

Field Food Safety & Protection

DNBI Influenced By

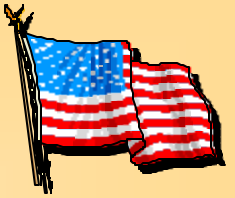
Sanitary Conditions

Equipment

Subsistence

Water

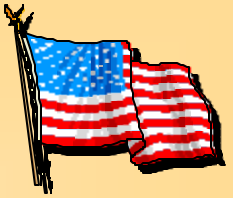
Layers of Protection



Field Feeding Problems

Observations --Army Wide--

- **Improper handling of rations**
- **Inadequate temperature controls & monitoring**
- **Untrained,unqualified or inexperienced personnel**
- **Inadequate Supervision by Food program Leaders**
- **Inadequate Surveillance by Medical personnel**

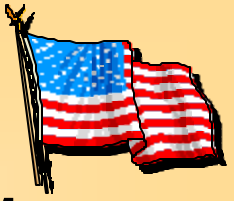


Knowing the standards does not assure safety…food processes must be managed and supervised at all levels.

'Risk management is the Army's principal risk-reduction process to protect the force.

…Our goal is to make risk management a routine part of planning and executing operational missions.'

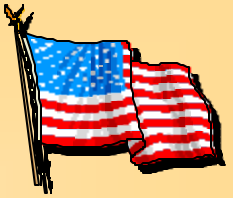
Chief of Staff, Army, July 1995



Common Sense Improvement

- Communication and Collaboration is key
  - **Eliminate stove-pipes and work together**
  - **Food Risk Assessment by Unit Cdrs & Food Team**

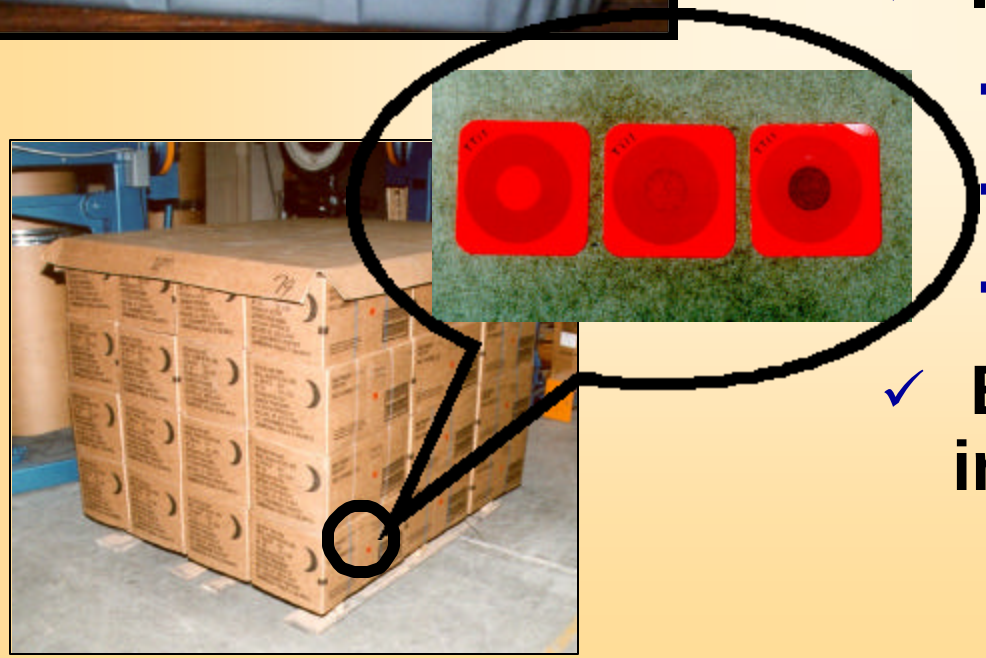
- Food Operations NCO's should solicit a Sr PMI or AVI to be their *"Unit Food Safety Advisor"*
  - **Pre-exercise training briefings**
  - **Field food handler training**
  - **Ration Person Training**
  - **Field Feeding Surveillance and Residual Inspections**



Risk Assessment / HACCP

- Conduct unit level risk assessment of the biological threat; conduct food operations risk assessment based on your menu.
  - ✓ **Employ HACCP Principles**
  - ✓ **CHPPM TG-244, The Medical NBC Battlebook**
    http://chppm-www.apgea.army.mil/armydocs.asp?pub_type=TG
  - ✓ **Need to identify potential points of human intervention based on ease and accessibility**
- Terrorist initiatives and motives will be difficult to correlate

Ration Inspection



- ✓ Inspect supplements, & enhancements upon receipt
- ✓ Identify problems:
  - ➔ package integrity
  - ➔ wholesomeness
  - ➔ contamination
- ✓ Examine TTI as quality indicator

Inspection of Field Rations

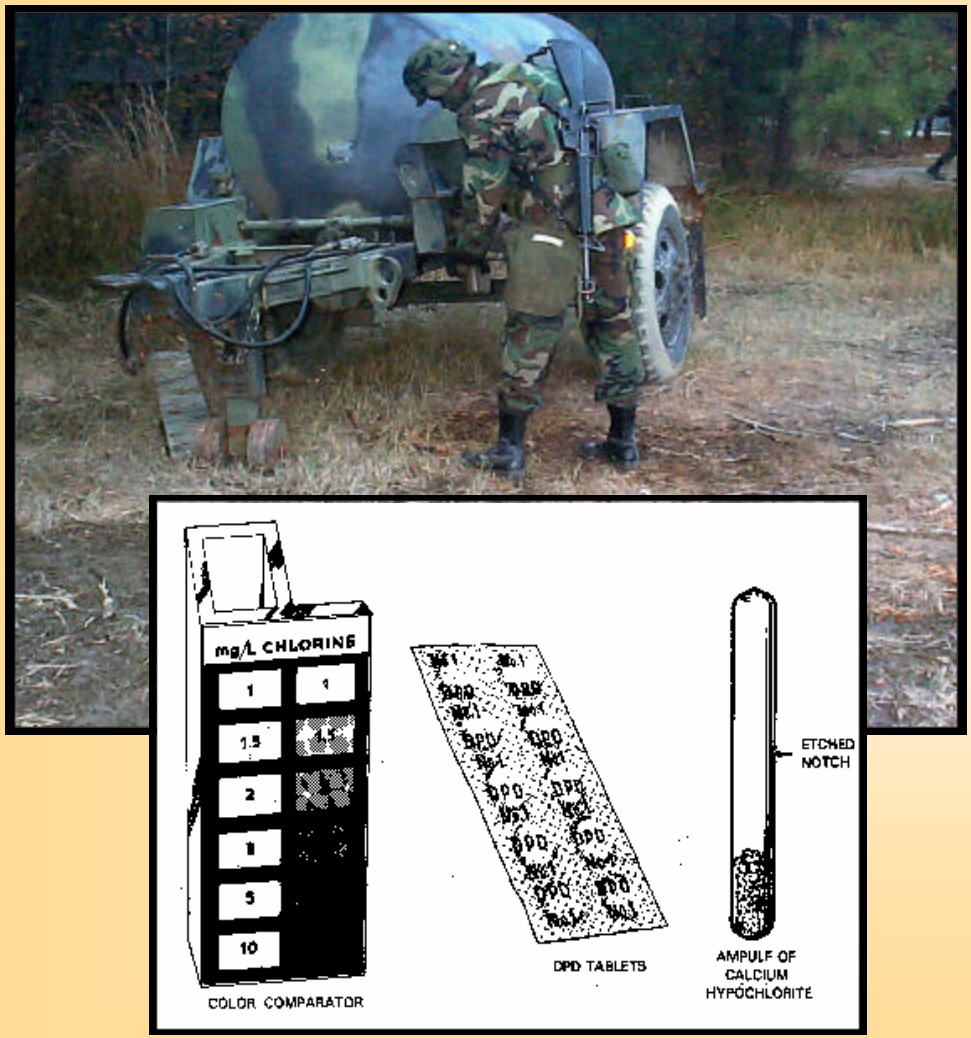
TISA: Installation Vet Personnel conduct routine inspections **(Never 100%)**

Unit: Ration personnel should check their rations upon receipt; Report suspect or questionable supplies to the AVI/TISO.

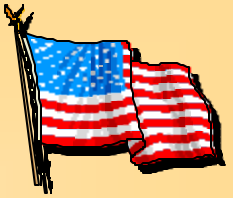
Temperature Standards

- Frozen & chilled PHFs stored at 40º F or below.
- Thaw PHFs in ice chest with ice to ensure 40º F or below is maintained.
- All field food cooked to internal temperature of 165º F or above.
- Minimum hot holding temperature for all cooked foods is 140º F for a maximum of 4 hours.

POTABLE WATER



- ✓ Inspect water trailer before use
- ✓ Obtain water from approved source or fill point
- ✓ Chlorinate to 1 ppm
- ✓ Protect from contamination



Conclusions

- Food as a vehicle for bioterrorism has been used.
- The potential for bioterrorism in the future is credible.
- Detection technology for biological agents is lacking ***(Has limited reliability).***
- Risk management is key to ensure safe food.
- Food operations sergeant must be vigilant in food safety practices and food protection measures.

QUESTIONS

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